

Remarks

Applicant respectfully requests reconsideration of this application as amended.

Claims 1 and 18 have been amended. No claims have been cancelled or added.

Therefore, claims 1, 3-4, 7-9, 18, 20-21, and 27-45 are presented for examination.

Claim Objections

Claims 1 and 18 stand objected to because of the following informalities: The claims recite “event selection control register (ECSR)” when the accurate acronym should have been “ESCR.” Claims 1 and 18 have been amended to correct the term “ECSR” to “ESCR.” Therefore, applicant respectfully requests the withdrawal of the claim objection to claims 1 and 18.

35 U.S.C. §103(a) Rejection

Claims 1, 3, 4, 7-9, 18, 20, 21, and 27-45 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Larsen et al. (U.S. Patent No. 5,835,705) in view of Diepstraten et al. (U.S. Patent 6,205,468) in view of Dreyer et al. (U.S. Patent No. 5,657,253). Applicant submits that the present claims are patentable over Larsen and Diepstraten in view of Dreyer.

Larsen discloses “the processor has first and second modes of operation . . . [and] when the performance monitor is operating in the first mode, a first counter within the performance monitor increments in response to each occurrence of the first event and a second counter within the performance monitor increments in response to each occurrence of the second event” (Larsen at col. 2, lines 2-9.) Larsen additionally discloses using a “performance monitor . . . [to receive] as inputs event occurrences . . .

[s]elected event occurrences among the numerous event occurrences that may be received by performance monitor are recorded . . . within Monitor Counters (PMCs) within performance monitor . . . [and the] performance monitor 50 outputs the value of the specified PMC” (Id. at col. 4, lines 46-64.) Larsen further discloses “in global mode the event occurrences generated by all of the logical partitions of processor are input into multiplexer. Multiplexer then routes the event occurrences to particular counters among PMCs in response to select input” (Id. at col. 5, lines 7-11).

Diepstraten discloses a context controller for managing multitasking in a processor. The context controller includes: (1) an event recorder that records occurrences of events, and (2) an encoder, associated with the event recorder, that, in response to a software instruction, priority encodes bits corresponding to at least some of the events to generate therefrom an event-dependent vector to allow the processor to branch as a function thereof. (Diepstraten at Abstract.)

Dreyer discloses an apparatus for measuring and monitoring various parameters that contribute to the performance of a processor. The apparatus includes a pair of programmable event counters for counting any two independent events selected from a predetermined list of processor events. A specialized register controls the operation of the event counters and also selects the events to be counted. The contents of the event counters can be accessed either by a supervisor mode program which reads an instruction or through a special access port. (Dreyer at Abstract.)

Claim 1 recites:

An apparatus, comprising:
a processor to execute a plurality of threads simultaneously, each thread including a series of instructions and resulting in an event;
an event selection control register (ESCR) coupled to the processor;

a first multiplexer coupled to the ESCR to select a class of events, based on a first set of control signals from the ESCR, from a group of event signals issued from the processor;

a second multiplexer coupled to the ESCR and the first multiplexer to mask, based on a second set of control signals from the ESCR, subclasses of the class of events in order to select an event that belongs to a subclass that is not masked;

a logic circuit coupled to the ESCR and the second multiplexer to qualify the event based on a thread ID and a thread current privilege level (CPL), the thread ID indicating a source of the event including a thread of the plurality of threads where the event occurred; and

an event counter to count the event qualified by the logic circuit.

Applicant submits that Larsen does not disclose or suggest a second multiplexer coupled to the ESCR and the first multiplexer to mask, based on a second set of control signals from the ESCR, subclasses of the class of events in order to select an event that belongs to a subclass that is not masked. The Final Office Action acknowledges as much by stating “Larsen does not expressly disclose: (d) a second multiplexer coupled to the ECSR and the first multiplexer to mask, based on a second set of control signals from the ESCR, subclasses of the class of events in order to select an event that belongs to a subclass that is not masked.” (Final Office Action mailed 3/17/06 at pg. 4.) However, the Final Office Action does rely on Diepstraten as disclosing this feature.

Applicant further submits that Diepstraten does not disclose or suggest such a feature. The Final Office Action cites Diepstraten at column 4, lines 42-50 and the event mask register 90 of Figure 3. However, applicant submits that neither of these cited portions of Diepstraten disclose or suggest a second multiplexer coupled to the ESCR and the first multiplexer to mask, based on a second set of control signals from the ESCR, subclasses of the class of events in order to select an event that belongs to a subclass that is not masked.

For instance, column 4, lines 42-47 of Diepstraten states:

[T]he context controller further includes an event masker, associated with the event recorder and the encoder, that masks ones of the events to yield the at least some of the events. Event masking may therefore optionally be employed to reduce the number of events factored into encoding and vector generation.

Nowhere in this cited portion of Diepstraten is there disclosed *a second multiplexer coupled to a first multiplexer and an ESCR to mask, based on control signals from the ESCR, subclasses of a class of events selected by the first multiplexer to result in an event that is not masked*. Although Diepstraten may be generally discussing event masking in this context, it does not disclose the structure provided by the cited feature of claim 1, namely it does not disclose the connections of the second multiplexer to a first multiplexer and an ESCR. Nor does this relied-upon portion of Diepstraten disclose the functioning of the second multiplexer, where it masks a class of events received from the first multiplexer based on control signals from the ESCR.

In addition, the Final Office Action points to the event mask register 90 of Figure 3 of Diepstraten as disclosing the cited feature of claim 1. (Id.) First, this event mask register is not a multiplexer at all; rather, it is a register. The Final Office Action explains around this difference by stating that “[a]lthough Diepstraten does not expressly disclose that the event masker is a multiplexer, Larsen already suggests implementing such event selection as one or more multiplexers (see, for example, column 5, lines 30-36).” (Id. at pg. 5.) However, the two multiplexers illustrated in Figure 3 of Larsen and described at column 5, lines 30-36 of Larsen only *operate concurrently, or in parallel*, on separate different threads in a multithreaded processor. (Larsen at Fig. 3 & col. 5, ll. 22-36.) They do not operate as provided by the cited feature of claim 1 by having the first multiplexer select a class of events, and then further having the second multiplexer mask

this resulting class of events according to subclasses to select an event. Applicant can find no disclosure or suggestion in Larsen of such dependency between the multiplexers of Larsen. Therefore, Larsen does not actually “suggest implementing such event selection as multiplexers”.

Second, the description in Diepstraten of the functioning of the event mask register 90 is not the same as the functioning of the second multiplexer as provided in the cited feature of claim 1. The event mask register 90 of Diepstraten is not connected to a first multiplexer and to an ESCR. Furthermore, the event mask register 90 of Diepstraten does not mask a class of events received from the first multiplexer based on control signals from the ESCR. (See, e.g., Diepstraten at col. 12, ll. 36-57.)

Finally, applicant submits that Dreyer does not disclose or suggest the cited feature of claim 1. The Final Office Action does not rely on Dreyer as disclosing this feature, nor can applicant find any disclosure or suggestion of this feature anywhere in Dreyer.

Therefore, as none of Larsen, Diepstraten, or Dreyer individually disclose or suggest a second multiplexer coupled to the ESCR and the first multiplexer to mask, based on a second set of control signals from the ESCR, subclasses of the class of events in order to select an event that belongs to a subclass that is not masked, any combination of Larsen, Diepstraten, and Dreyer does not disclose or suggest this feature. The Final Office Action responds to applicant’s arguments that “the combination of Larsen, Diepstraten, and Dreyer as a whole would have suggested to one of ordinary skill the art” the feature of claim 1. (Final Office Action at pg. 2, pt. 2.) However, if none of Larsen, Diepstraten, and Dreyer individually disclose a particular feature of a claim, then

logically there is no possibility that the combination of the references can disclose the feature.

Applicant has merely chosen to respond to the Office Action arguments by pointing out that *none* of the provided references disclose a particular feature of a claim, and therefore any combination of these references cannot disclose this feature. As applicant has shown above, none of Larsen, Diepstraten, or Dreyer disclose a second multiplexer coupled to the ESCR and the first multiplexer to mask, based on a second set of control signals from the ESCR, subclasses of the class of events in order to select an event that belongs to a subclass that is not masked. As a result, claim 1, as well as its dependent claims, is patentable over the combination of Larsen and Diepstraten in view of Dreyer.

Independent claims 18, 32, and 40 contain limitations similar to those of claim 1. Accordingly, applicant respectfully requests the withdrawal of the rejection of claims 18, 32 and 40, as well as their dependent claims, for the reasons discussed above with respect to claim 1.

Applicant respectfully submits that the rejections have been overcome and that the claims are in condition for allowance. Accordingly, applicant respectfully requests the rejections be withdrawn and the claims be allowed.

The Examiner is requested to call the undersigned at (303) 740-1980 if there remains any issue with allowance of the case.

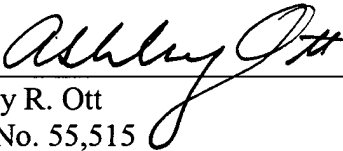
Applicant respectfully petitions for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17(a) for such an extension.

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,

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